

$$1. K_{eq} = \frac{[N_2O_4(g)]}{[NO_2(g)]^2}$$

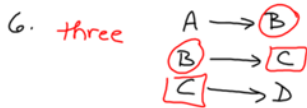
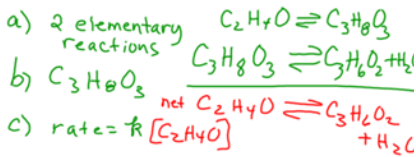
$$5.6 = \frac{0.66 \text{ mol}}{x^2} \quad x^2 = \frac{0.66}{5.6} = 0.118$$

$$x = 0.34$$

$$a) K_{eq} = \frac{[N_2O_4(g)]^2}{[NO]^4 [O_2]^2}$$

$$d) K_{eq} = \frac{[SO_3(g)] [NO(g)]}{[SO_2(g)] [NO_2(g)]}$$

a) right c) right  
b) right d) no effect

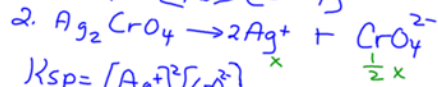


$$\text{rate} = k [HgCl_2]^2 [Na_2C_2O_4]$$

18.3

$$1a) K_{sp} = [Al][OH]^3$$

$$b) K_{sp} = [Pb][CrO_4]^2$$



$$K_{sp} = [Ag^+]^2 [CrO_4^{2-}]$$

$$= x^2 \cdot \frac{1}{2}x = \frac{1}{2}x^3$$

$$1.2 \times 10^{-12} = \frac{1}{2}x^3$$

$$2.4 \times 10^{-12} = x^3$$

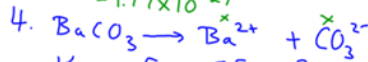
$$1.3 \times 10^{-4} = x$$



$$K_{sp} = [Al^{3+}][OH^-]^3$$

$$= (9.0 \times 10^{-8})(2.7 \times 10^{-7})^3$$

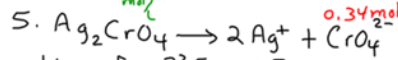
$$= 1.77 \times 10^{-27}$$



$$K_{sp} = [Ba^{2+}][CO_3^{2-}]$$

$$5.0 \times 10^{-9} = x^2$$

$$7.1 \times 10^{-5} = x$$



$$K_{sp} = [Ag^+]^2 [CrO_4^{2-}]$$

$$1.2 \times 10^{-12} = [Ag^+]^2 [0.34]$$

$$\frac{1.2 \times 10^{-12}}{0.34} = \frac{[Ag^+]^2}{0.34}$$

$$\sqrt{3.5 \times 10^{-12}} = Ag^+$$

$$1.9 \times 10^{-6} = Ag^+$$

## Precipitation

$$6. SrSO_4 \quad 0.400 L \times 0.020 \frac{\text{mol}}{L} = 0.008 \text{ mol}$$

$$Ca(NO_3)_2 \quad 0.600 L \times 0.0050 \frac{\text{mol}}{L} = 0.003 \text{ mol}$$



$$\text{Product} \quad 0.003 \times 0.008 = 2.4 \times 10^{-5}$$

$$K_{sp} CaSO_4 \text{ is } 2.4 \times 10^{-5}$$

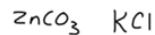
No there is NOT A PRECIPITATE

Precipitation

7.

$$ZnCl_2 \quad 0.500 L \times 3.9 \times 10^{-3} \frac{\text{mol}}{L} = 1.95 \times 10^{-3}$$

$$K_2CO_3 \quad 0.500 L \times 2.6 \times 10^{-3} \frac{\text{mol}}{L} = 1.3 \times 10^{-3}$$



$$\text{Precipitate} \quad \text{Product} \quad 1.95 \times 10^{-3} \times 1.3 \times 10^{-3}$$

$$K_{sp} = 1.0 \times 10^{-10} \quad = 2.5 \times 10^{-6}$$

YES A PRECIPITATE